TABLE 129

Impact of producing cloud-based computing systems and applications or goods or services with cloud-based computing systems and applications on worker types, by industry: 2016–18 (Number and percent)

		Companies (number)		Production	workers			Nonprodu	ction workers	S		Supervisory	workers		Nonsupervisory workers				
Industry	NAICS code			Decreased	Did not change	Did not employ		ed Decreas	Did not change		Increased	Decreased	Did not change		-	Decreased	Did not change		
All industries	11, 21- 23, 31- 33, 42-81	152,252	9.6	1.8	54.2	34.4	8.7	2.3	63.9	25.1	7.2	1.7	66.7	24.4	9.1	2.0	64.2	24.7	
Manufacturing industries	31-33	3,553	13.2	5.0	69.0	12.8	11.8	4.4	71.2	12.6	7.7	3.8	73.7	14.8	11.0	3.3	67.9	17.8	
Food	311	241	12.9 r	D	59.3	12.0	4.6	r D	59.3	20.3	D	D	62.2	21.2	D	D	59.3	21.2	
Beverage and tobacco products	312	74	18.1	0.0	61.1	20.8	r 26.1	r 0.0	49.3	24.6	16.4	0.0	50.7	32.9	r 16.4	0.0	50.7	32.9	
Textile, apparel, and leather products	313- 16	136	14.0 r	D	51.5	30.1	r 7.4	r D	55.9	31.6	12.5 r	- D	53.7	28.7	r 9.6 r	0.0	54.4	36.0	
Wood products	321	99 r	5.1	D	36.4	r 13.1	r 4.0	0.0	82.1	14.0 r	D	D	78.8	14.1	r 5.1	D	72.7 r	17.2	
Paper	322	6	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	D	0.0	83.3	0.0	D	0.0	83.3	0.0	
Printing and related support activities	323	603	20.7	4.6	71.1	3.6	16.9	r 4.1	68.6	10.4	12.1 r	2.8 r	76.5	8.6	15.3 r	4.1 r	71.0	9.6	
Petroleum and coal products	324	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Chemicals	325	173	2.9	D	88.4	4.6	r 4.0	D	89.6	D	4.0	0.0	92.4	3.5	r 2.9	0.0	93.6	3.5	
Pesticide, fertilizer, and other agricultural chemical manufacturing	3253	48 r	0.0	0.0	100.0	0.0	0.0	D	D	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	
Pharmaceuticals and medicines	3254	18	16.7 r	0.0	66.7	r D	29.4	0.0	70.6	r 0.0	27.8	0.0	66.7	r D	27.8	0.0	66.7 r	D	
Soap, cleaning compound, and toilet preparation manufacturing	3256	26	0.0	0.0	84.6	D	0.0	0.0	84.6	D	0.0	0.0	84.6	D	0.0	0.0	84.6	D	
Other chemicals	other 325	80	D	D	88.8	D	D	0.0	95.0	D	D	0.0	93.8	D	0.0	0.0	98.8	D	
Plastics and rubber products	326	118 r	D	D	93.2	0.0	D	D	86.4	D	D	D	96.6	0.0	D	D	89.8	D	
Nonmetallic mineral products	327	85	18.8	D	67.1	14.1	r 9.4	r D	61.2	22.4	9.3 r	0.0	65.1	25.6	9.3 r	0.0	48.8	41.9	
Primary metals	331	5	80.0	0.0	D	0.0	D	0.0	D	0.0	D	0.0	D	D	D	0.0	D	D	

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Impact of producing cloud-based computing systems and applications or goods or services with cloud-based computing systems and applications on worker types, by industry: 2016–18 (Number and percent)

				Production	workers			Nonproductio	on workers	;		Supervisory	workers		Nonsupervisory workers				
Industry	NAICS code	Companies (number)		Decreased	Did not change	Did not employ	Increased	Decreased	Did not change	Did not employ	Increased	Decreased	Did not change	Did not employ		Decreased	Did not change	Did not employ	
Fabricated metal products	332	290	21.4	D	73.4	D	20.3	0.0	68.7	11.0 r	1.7 r	0.0	74.9	23.4 r	20.0 r	D	51.7	27.6 r	
Machinery	333	298	27.9 ı	D	46.3	25.8 r	28.2	D	50.0	21.5 r	26.5 r	D	51.0	21.8 r	26.5 r	D	51.0	21.8 r	
Computer and electronic products	334	527	7.8	3.0 r	75.7	13.5 r	11.8	4.7 r	77.0	6.5	3.8	3.2	80.8	12.3 r	11.8	2.8 r	74.0	11.4 r	
Communications equipment	3342	111	0.0	0.0	87.2	12.8 r	D	0.0	85.6	D	D	D	90.1	D	D	0.0	85.6	D	
Semiconductor and other electronic components	3344	38	D	23.7 r	65.8	D	D	18.4 r	65.8	D	D	13.2	73.7	D	D	18.4 r	65.8	D	
Navigational, measuring, electromedical, and control instruments	3345	225	4.9	4.0 r	71.2	19.9 r	17.3	. D	72.4	7.6	4.9	D	73.3	18.7 r	16.9 r	D	62.2	18.7 r	
Other computer and electronic products	other 334	154	18.2	0.0	76.6	D	6.5	D	81.2	7.1 r	4.5	D	86.4	9.1	7.1	D	85.7	7.1 r	
Electrical equipment, appliances, and components	335	114	20.6	0.0	53.6	25.9 r	15.9	0.0	72.6	11.5 r	19.7 r	0.0	64.1	16.3 r	15.7 r	0.0	61.7	22.6	
Transportation equipment	336	99	6.1 ı	D	76.8	11.1 r	12.1	D	76.8	8.1 r	6.1	D	82.8	D	12.1	D	76.8	D	
Automobiles, bodies, trailers, and parts	3361- 63	65	9.2	D	76.9	D	18.5	D	73.8	0.0	9.2	D	81.5	0.0	16.9 r	D	73.8	0.0	
Aerospace products and parts	3364	17	0.0	0.0	82.4	D	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	
Other transportation	other 336	18	0.0	0.0	66.7 r	D	0.0	0.0	57.9 r	42.1 r	0.0	0.0	66.7 r	D	D	0.0	72.2 r	D	
Furniture and related products	337	125	D	D	88.0	8.8 r	D	D	89.6	D	D	0.0	92.8	D	D	0.0	88.8	8.8 r	
Miscellaneous	339	561	5.7	4.6 r	71.6	18.2 r	2.0	D	77.7	12.5 r	2.1	D	74.7	15.7 r	2.0	D	70.4	23.9 r	
Medical equipment and supplies	3391	238	5.5	D	81.5	3.8 r	3.8	D	89.5	4.2 r	3.8 r	D	89.1	3.8 r	3.8 r	D	83.2	3.8 r	
Other miscellaneous manufacturing	3399	324	5.9	D	64.5	28.4 r	D	D	69.1	18.8 r	D	D	63.3	24.4 r	D	0.0	60.5	38.9	

TABLE 129

Impact of producing cloud-based computing systems and applications or goods or services with cloud-based computing systems and applications on worker types, by industry: 2016–18 (Number and percent)

				Production	workers		N	lonproductio	n workers			Supervisory	workers		Nonsupervisory workers				
Industry	NAICS code	Companies (number)		Decreased	Did not change	Did not employ	Ingrased	Decreased	Did not change	Did not		Decreased	Did not change	Did not		Decreased	Did not change	Did not	
illuustiy		(Hullibel)	ilicieaseu	Decreased	Change	employ	Ilicieaseu	Decreased	change	employ	ilicieaseu	Decreased	Change	employ	ilicieaseu	Decreased	change	employ	
Nonmanufacturing industries	11, 21- 23, 42-81	148,700	9.5	1.7	53.8	35.0	8.6	2.2	63.8	25.4	7.2	1.6	66.6	24.6	9.1	2.0	64.0	24.9	
Agriculture, forestry, fishing, and hunting	11	204	0.0	0.0	60.8	D	0.0	0.0	60.8 r	D	0.0	0.0	60.8 r	D	0.0	0.0	60.8 r	D	
Mining, extraction, and support activities	21	40	D	0.0	85.0	D	0.0	0.0	90.0	D	0.0	0.0	92.5	D	0.0	0.0	90.0	D	
Utilities	22	14	50.0 r	0.0	50.0 r	0.0	D	0.0	64.3 r	0.0	D	0.0	64.3 r	0.0	D	0.0	64.3 r	0.0	
Construction	23	7,818	13.2	1.8 r	57.1	27.9	11.3	D	64.5	23.5	11.5	D	67.8	19.4	12.5	D	63.6	22.7	
Wholesale trade	42	7,828	8.3	2.2	57.2	32.3	9.4	2.8	68.7	19.1	8.3	0.9 r	70.0	20.8	8.9	1.5 r	69.5	20.1	
Retail trade	44-45	10,439	6.3	2.9	56.5	34.3	7.3	2.5	65.2	25.0	5.0	1.6 r	66.0	27.4	7.3	1.4 r	62.7	28.6	
Transportation and warehousing	48-49	2,155	20.5	0.4 r	50.7	28.4	14.0	2.4 r	56.9	26.7	24.1	D	56.4	19.3	13.7 r	2.5 r	56.9	26.9	
Information	51	10,288	12.5	1.8	52.5	33.2	12.8	2.4	67.6	17.2	13.2	1.4	68.4	17.0	14.4	2.3	66.7	16.6	
Publishing	511	3,934	12.2	1.3	54.6	31.9	14.5	2.6	67.4	15.5	16.7	1.6	67.8	13.9	17.0	2.3	65.9	14.8	
Newspaper, periodical, book, and directory publishers	5111	315	10.5	6.3	73.0	10.2	D	6.7	86.0	6.7	D	6.3	83.2	6.3	4.4 r	6.7	71.3	17.6	
Software publishers	5112	3,618	12.4	0.9	53.0	33.7	15.7	2.2	65.9	16.2	17.9	1.2	66.4	14.5	18.0	1.9 r	65.5	14.6	
Telecommunications	517	1,243	10.0	1.0 r	44.2	44.9	4.9	D	68.3	24.7	7.3 r	D	62.8	28.6	6.2	2.7 r	67.9	23.2	
Data processing, hosting, and related services	518	3,829	13.3	2.7	50.8	33.2	15.4	3.2	65.8	15.6	13.2	1.7 r	69.0	16.1	16.0	2.8	65.1	16.1	
Other information	other 51	1,282	13.6	1.3	59.3	25.8	7.5	D	71.8	20.4	8.2	0.3 r	74.1	17.3	9.6	1.1	72.0	17.3	
Finance and insurance	52	8,355	10.5	D	48.7	40.3	12.8	1.9	55.8	29.5	8.7	D	57.6	33.2	13.3	1.5 r	58.1	27.1	
Real estate and rental and leasing	53	5,069	6.4	D	48.0	43.6	6.7	D	58.8	33.5	2.9 r	D	61.7	33.2	5.2	3.7	55.4	35.7	
Lessors of nonfinancial intangible assets (except copyrighted works)	533	D	0.0	0.0	0.0	D	0.0	0.0	D	0.0	0.0	0.0	D	0.0	0.0	0.0	D	0.0	

TABLE 129

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				Production	n workers		N	Ionproductio	on workers	1		Su	pervisory	workers		Nonsupervisory workers				
Industry	NAICS code	Companies (number)		Decreased	Did not change		Increased	Decreased	Did not change	Did not employ	Increase	ed D	ecreased	Did not change	Did not employ	Increased	Decreased	Did not change	1	
Other real estate and rental and leasing	other 53	5,068	6.4	D	48.0	43.7	6.7	D	58.8	33.5	2.9	r	D	61.7	33.2	5.2	3.7	55.4	35.7	
Professional, scientific, and technical services	54	60,394	9.3	1.2	53.3	36.2	8.6	1.9	64.7	24.8	6.3		1.2	67.9	24.6	9.0	1.9	65.5	23.6	
Legal services	5411	4,086	7.7	1.5 r	r 38.0	52.8	4.4	2.7 r	50.2	42.7	6.4		D	52.7	39.6	6.3	3.8	55.0	34.9	
Accounting, tax preparation, bookkeeping, and payroll services	5412	7,179	7.7	1.9	49.9	40.5	8.6	2.6	64.4	24.4	4.2		D	70.6	24.3	7.9	1.8	r 69.0	21.3	
Architectural, engineering, and related services	5413	4,304	7.4	1.0	r 67.2	24.4	6.3	2.0 r	73.7	18.0	5.5		D	77.6	16.4	6.8	0.8	r 76.0	16.4	
Specialized design services	5414	1,106	D	0.0	57.3	38.2	D	D	64.7	26.3	D		0.0	64.5	31.0	D	0.0	58.1	37.4	
Computer systems design and related services	5415	31,736	9.8	1.0	57.3	31.9	8.4	1.4	67.3	22.9	6.0		1.1	70.2	22.7	9.9	1.7	66.2	22.2	
Management, scientific, and technical consulting services	5416	8,132	11.1	1.8	r 41.3	45.7	12.9	1.1 r	59.7	26.3	8.5		0.9 r	63.1	27.5	8.7	1.5	r 62.9	26.9	
Scientific research and development services	5417	548	14.1	1.3	r 57.3	27.3	16.8	D	72.1	9.3	15.0	r	0.0	75.0	9.9	15.7	1.8	r 71.1	11.3	
Advertising, public relations, and related services	5418	1,556	6.9	1.7	52.5	38.9	7.4	5.7	61.9	25.0	7.6		2.6 r	66.5	23.3	10.9	4.8	r 61.2	23.1	
Other professional, scientific, and technical services	5419	1,751	11.8	0.0	47.7	40.4	7.6 r	6.1 r	54.4	31.9	7.7	r	7.3	52.6	32.4	7.5	D	61.1	28.0	
Management of companies and enterprises	55	55 r	0.0	0.0	0.0	100.0	0.0	0.0	D	D	0.0		0.0	D	D	0.0	0.0	D	D	
Administrative and support and waste management and remediation services	56	6,923	10.0	D	54.9	34.6	5.3	3.0	67.8	23.9	4.0	r	2.6	68.9	24.5	6.2	0.6	r 65.2	28.0	

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Impact of producing cloud-based computing systems and applications or goods or services with cloud-based computing systems and applications on worker types, by industry: 2016–18 (Number and percent)

				Produc	tion	workers			N	onproductio	n workers			s	uperviso	ry v	workers		Nonsupervisory workers					
Industry	NAICS code	Companies (number)	Increased	d Decreas	sed	Did not change	Did not employ	Increase	ed	Decreased	Did not change	Did not employ		ed I	Decrease	ed	Did not change	Did not employ	Increas	ed	Decreased	Did not change	Did not employ	
Educational services	61	2,242	10.2	D		44.2	43.8	10.2		D	62.0	25.9	16.3		D		51.6	28.3	10.2	r	D	64.1	21.9	
Health care and social assistance	62	14,288	9.5	1.9		54.4	34.2	8.3		3.1	61.5	27.1	6.5		3.4		66.7	23.4	9.0		2.0	62.5	26.5	
Health care services	621- 23	13,152	10.3	1.7	r	57.1	30.9	8.1		3.3	62.8	25.8	6.1		2.9		67.9	23.1	8.7		2.1	63.0	26.2	
Social assistance	624	1,136	D	D		23.2	73.1	11.4	r	D	46.0	42.4	11.5	r	8.4	r	53.4	26.7	11.9		0.0	58.1	30.0	
Arts, entertainment, and recreation	71	1,183	0.0	0.0		48.2	51.8	D		0.0	48.6	51.1	D		0.0		58.2	41.5	D		D	53.3	46.2	
Accommodation and food services	72	5,872	11.0	6.0		53.3	29.7	5.9	r	5.2	55.6	33.3	6.8		4.5		63.6	25.1	5.9		6.1	62.0	26.0	
Other services	81	5,527	5.1	3.2	r	64.5	27.2	1.8	r	D	67.6	29.0	2.6	r	D		71.8	24.8	3.1	r	2.4	64.2	30.3	

D = withheld to avoid disclosing data for individual companies; data are included in higher-level totals. r = relative standard error > 50%.

NAICS = 2017 North American Industry Classification System.

Note(s):

Detail may not add to total because of rounding or unavailable NAICS detail for select records beyond the 4-digit industry classification. Industry classification is based on dominant establishment payroll. Statistics are representative of companies located in the United States.

Source(s):

National Center for Science and Engineering Statistics and Census Bureau, 2019 Annual Business Survey: Data Year 2018.